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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,674	06/04/2001	Zoran Krivokapic	F0537	5266

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EXAMINER

FENTY, JESSE A

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 10/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/873,674

Applicant(s)

KRIVOKAPIC, ZORAN

Examiner

Jesse A. Fenty

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 21-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-14, 24 and 25 is/are allowed.
- 6) ☒ Claim(s) 1-9, 21-23 and 27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 4-8, 22, 23 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Patent No. 5,600,168) in view of Hwang (U.S. Patent No. 5,567,966).

In re claim 1, Lee discloses a semiconductor device, comprising:

A first gate (21) defining a first channel region interposed between a source and a drain region;

A second gate (17) straddling the first gate defining second channel regions interposed between the first channel region and the source and the drain (24); and

A contact (22) connecting the first gate with the second gate.

Lee does not expressly disclose the device comprising an SOI device, nor the device having a high dielectric gate insulation region with a dielectric constant greater than silicon dioxide. Clevenger discloses an SOI device with a high dielectric constant gate insulation region (20, hafnium oxide (see applicant's specification, pp. 5, lines 5-6)). It would have been obvious for one skilled in the art at the time of the invention to form an SOI device as disclosed by Clevenger for the purpose, for example of insulating the active region from subsurface currents. It would also have been obvious for one skilled in the art to use a high dielectric constant for the

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gate dielectric film of Lee as disclosed by Clevenger for the purpose, for example, of lowering gate conductor leakage (Clevenger; column 1, lines 34-36).

In re claim 4, Lee in view of Clevenger discloses the device of claim 1, wherein the source and the drain include main source and drain regions and source and drain extension regions (24).

In re claim 5, Lee in view of Clevenger discloses the device of claim 1, including a silicide layer (100, Clevenger) formed on the source and drain.

In re claim 7, Lee in view of Clevenger discloses the device of claim 1, wherein a second silicide layer (22, Lee) formed on electrodes of the second gate.

In re claims 6 and 8, Lee in view of Clevenger discloses the devices of claims 1 and 7 respectively, but does not expressly disclose the thickness of the silicide layer being between 100 and 400 angstroms. It would have been obvious to one having ordinary skill in the art at the time the invention was made to determine the optimal thickness of the silicide layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F. 2c 272, 205 USPQ 215 (CCPA 1980).

In re claim 22, Lee in view of Clevenger discloses the device of claim, including a silicide layer (100) formed on the main source and drain region.

In re claim 23, Lee in view of Clevenger discloses the device of claim 1, further including a liner interposed between the first gate and the second gate.

In re claim 27, Lee in view of Clevenger discloses the device of claim 1. The limitation regarding a fully depleted substrate is a recitation of the intended use of the claimed device.

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Terms that simply set forth the intended use, a property inherent in or a function, do not differentiate the claimed composition of these elements from those known to prior art.

3. Claims 2, 3 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Clevenger as applied to claim 1 above, and further in view of Mandelman et al. (U.S. Patent No. 6,097,070).

In re claims 2, 3 and 21, Lee in view of Hwang discloses the device of claim 1, but does not expressly disclose different ON and OFF states per different gate. As disclosed in the invention, these ON and OFF states are responsive of the different materials of the two gates. Mandelman discloses a similar device to the claimed invention with two different gate electrode materials (25, 26). It would have been obvious for one skilled in the art at the time of the invention to use two different gate layers, for example different doped polysilicon, for the similar purpose of reduced junction leakage by means of lower surface doping level concentration for the channel array (Mandelman; column 3, lines 15-27).

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Clevenger as applied to claim 1 above, and further in view of Liu et al. (U.S. Patent No. 6,218,276 B1).

In re claim 9, Lee in view of Clevenger discloses the device of claim 1, but does not expressly disclose the two different silicide layers disposed on the separate gate regions. Liu discloses the use of two different silicide layers for use in gate structures. It would have been obvious for one skilled in the art at the time of the invention to use two different silicide layers

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to connect to the separate gate structures of Lee in view of Hwang for the purpose, for example, of creating more design flexibility to define the performance of the device (Liu; column 6, lines 1-10).

Allowable Subject Matter

5. Claims 10-14, 24 and 25 are allowed.

Conclusion

6. Applicant's amendment to claim 1, specifying the permittivity of the first gate dielectric having a relative permittivity greater than silicon dioxide, necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse A. Fenty whose telephone number is 703-308-8137. The examiner can normally be reached on 5/4-9 1st Fri. Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 703-308-1690. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Jesse A. Fenty
Examiner
Art Unit 2815

JAF



JEROME JACKSON
PRIMARY EXAMINER